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AUTHOR Falk, William W.; Comfort, Allen
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ABSTRACT

In an effort to nearly replicate Bidwell and Kasarda (1975) and to analyze the efficacy of an adapted version of their model to predict high school retention, all 66 school districts in Louisiana were surveyed to determine how many freshman students in 1971-72 graduated in 1974-75 and why. An alternative model was devised which differed from the Bidwell-Kasarda model in that it included some new exogeneous variables, a new dependent variable (retention instead of achievement), and a reordering of the causal sequence within the model. Variables were categorized as follows: environmental conditions (school district size, fiscal resources, disadvantaged students, parental education, percent nonwhite, and percent rural); structural conditions (pupil-teacher ratio, administrative intensity, and professional support component); staff composition conditions (certified staff qualifications); and dependent variable (retention). Results indicated the model worked well in accounting for variance in two of the intervening variables, pupil-teacher ratio and administrative intensity, but for the other two intervening variables, professional staff and qualifications of teachers, and for the dependent variable, retention, the model accounted for only a small amount of the variation. It was concluded that neither this model nor the Bidwell-Kasarda model accounted for much variation--21% and 25%, respectively. (JC)

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SCHOOL DISTRICT ORGANIZATION AND ATTRITION IN HIGH SCHOOL ENROLLMENT: FURTHER CONSIDERATION OF THE BIDWELL-KASARDA MODEL

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William W. Falk
and
Allen Comfort

Louisiana State University

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SCHOOL DISTRICT ORGANIZATION AND ATTRITION IN HIGH SCHOOL ENROLLMENT: FURTHER CONSIDERATION OF THE BIDWELL-KASARDA MODEL

The Problem

In their efforts to study education, sociologists have analyzed many of the same phenomena that they have researched in non-education settings; thus there are research activities which are parallelled across specific sociological topics. One topic which has received attention is the ability of formal organizations to accomplish goals which they have set for themselves (see, for example, Simon, 1969; Sills, 1969; Popenoe, 1977: 164-169; and Schwartz, 1975: 108-110). In fact, this is often used as a chief indicator of organization "success". A very recent article by Bidwell and Kasarda (1975) used this premise in analyzing the effectiveness of school district organization. Their article engendered a rather prolonged debate between themselves and two groups of critics (Hannan, et al., 1976; and Alexander and Griffin, 1976a and 1976b).

This paper considers the model of Bidwell and Kasarda, the various models of their critics, and presents an alternative model of school district organizational effectiveness. The alternative model is methodologically strengthened by the incorporation of one new input variable, the use of a new dependent variable, and the reordering of the causal sequence within the model. The purpose of this research is to nearly replicate Bidwell and Kasarda and to analyze the efficacy of an adapted version of their model to predict student retention. One question is central to the study: How have demographic and organizational considerations varied with district "success" as measured by the retention/attrition within a cohort of high school students? The

question to be addressed in this study is firmly anchored in the organizational literature in both sociology and education (for example, Dentler and Warshauer, 1965; Hunt, 1964; Tannenbaum, 1966; Stroup and Robins, 1972).

Rationale for the Study

Since roughly the turn of the century, public schools have been based on what some authors (e.g., Callahan) have called a "factory model." As Callahan(1968) has put it, this has resulted in a "cult of efficiency." The factory metaphor suggest the symbolism of the school as engaged in a production process. The goal of this production is ostensibly educated students. Ignoring the assumption here that there is a linear relationship between teacher→education→educated student, we may examine a slightly different account of school district "success." Since public schools are largely funded by state and local taxes, we find a peculiar sustentation axiom for the school district's viability--the greater the number of enrolled students, the greater the available money for the district. The importance of this for the district cannot be discounted--it must retain a large percentage of its students (and somehow replace those, who, for whatever reasons, drop out). In a Darwinian sense, this retention is absolutely necessary for the organization's survival. As Schrieber (1964) has put it, this is a test of the district's "holding power."

Despite the findings of the Coleman (1966) and Jencks (1972) studies, many people (to include citizens at large and their respective legislators) still believe that schools are the chief propogators of intelligent youth. The prevailing common-sensical notion would seem to be that the longer one stays in school, the better off one will be. As Illich (1970) has stated

it, "... grace is reserved for those who accumulate years in school" (p. 65). Since schools are under a certain societal pressure to produce, it is hardly surprising that there is some confusion about whether good students produce good schools or vice-versa. This dialectic is similar to the observation of Durkheim (1950) that society exists only through individuals but individuals exist only through society.

In the work of Bidwell and Kasarda, the premise was that if one knew various demographic characteristics and structural characteristics of a school district, one could predict student achievement levels. In a way not intended by them, this is illustrative of the schools having their productive capacity accounted for--it is (to keep in the business lexicon) a kind of quality control. However as their critics (Hannan et al., 1976; Alexander and Griffin, 1976a; 1976b) pointed out, Bidwell Kasarda were using grouped data to predict an individual phenomenon. Thus, the applicability of their approach and results would be problematic until their measurement problems were alleviated.

In the study reported here, the problem of disparate levels of analysis is remedied. Rather than use grouped data to predict an individual phenomenon, we propose to keep the level of analysis constant. Instead of using median achievement scores as the dependent variable, we have used the retention rate of the school district. While there is voluminous research on individual "drop outs" (see, for example, Miller et al., 1964; Bredemeir and Toby, 1972; Lammers, 1967; Mannine, 1962; Moore, 1954; Brown and Peterson, 1969), and while dropping out of school is an individual act, it is known that schools may be the

initiators of the student's decision to leave. This is certainly the case with students who are expelled. Our premise (again, similar to Bidwell and Kasarda) is that if the schools may be partially responsible for failure (i.e., losing students), so, too, may they be partially responsible for success (i.e., retaining students).

The Bidwell-Kasarda Model

As discussed above, there is reason to believe that a relationship should exist between demographic variables, organizational variables, and organizational goals. For Bidwell and Kasarda, this took the form of the model in Figure 1. We may note there that the model is cast in a form

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Figure 1 about here

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whereby antecedent structural variables (SIZE--size of district enrollment; RESOURCES--financial resources; DISAD--percent disadvantaged population; and EDUC--educational level of selected age cohorts for the male and female population) are posited as preceding and influencing intervening organizational varialbes (PTRATIO--pupil-teacher ratio; ADMIN--administrative-faculty ratio; PROF--percent of district staff classed as "professionals"; and QUALIF--percent of district staff with at least a master's degree) with those variables then acting in conjunction with percent non-white in the district to affect the median level of student achievement for selected age cohorts in high school. The model makes the assumptions stated by Labovitz and Hagedorn (1971), Heise (1969), Duncan (1975) and others for

one to do casual analysis.

Critiques of Bidwell and Kasarda

Hannan, et al. were especially interested in the large effects reported by Bidwell and Kasarda since the effects were so much larger than those reported by other researchers. Hannan et al. attribute this discrepancy to three analytical errors. First, Bidwell and Kasarda omitted some input variables that Hannan et al. considered necessary, especially the omission of SES background and student ability which are highly correlated with student achievement. Second, there was a problem of changing levels of analysis. Because student achievement (an individual phenomenon) was based on an aggregate measure, this grouping magnified bias and large effects resulted. Third, standardized regression coefficients are sensitive to grouping. Hannan et al. report analysis from data on California school districts to support their arguments.

Alexander and Griffin also criticized Bidwell and Kasarda for analytical errors. First, they felt that Bidwell and Kasarda exaggerated the practical importance of their results. If academic achievement is primarily "an attribute of individual students", then most variation in achievement scores should be between students not between districts. Second, Bidwell and Kasarda omit a student academic ability measure which other studies have shown to be one of the strongest determinants of academic performance. Alexander and Griffin analyze data from Maryland school districts and find that a model without an IQ measure is both incomplete and misleading.

In their rejoinders, Bidwell and Kasarda (1976a, 1976b) respond to three of the principal criticisms: (1) the level of analysis, (2) the omission of input variables, and (3) the practical significance of the study. They stress that their study was of organizational effectiveness not individual achievement. For them an aggregate measure of achievement allows an ecological approach to the larger question of organizational effectiveness. While they concede that student ability and parental SES affect student achievement, they argue that SES variables already are contained in their model via such "proxies" as DISAD, EDUC, and PNONW. They dispense with student ability on the grounds that any measure of it (e.g., IQ) is problematic and open to criticism. Finally, the practical significance of their study is important since student achievement may be influenced, even in a small way, by organizational considerations. Schooling does affect the individual, therefore, school district organization should have some effect on variation within school districts as well as between districts. In summary, the debate between Bidwell and Kasarda and their critics suggests the maxim that in social research as in other things, it is a case of caveat emptor.

An Alternative Model

The model proposed in this study is very similar to the Bidwell-Kasarda model. The main difference is that our model includes some new exogenous variables as well as a new dependent variable, as shown in Figure 2.

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This new model consists of six environmental variables of the school districts, three variables regarding the district structure, and one variable of staff composition. The variables are linked in a causal model to student retention rates for the school district. The environmental conditions are size, monetary resources, the percent of the children in the district from low-income families, educational levels of the parental risk population of the school district (all of these were included in the original Bidwell-Kasarda model), percent of the population who are nonwhite and percent of the population of the school district classified as rural residents. The school district structural variables include the pupil-teacher ratio, the ratio of administrators to classroom teachers, and the ratio of prefessional staff to classroom teachers. The staff composition variable pertains to the qualification level of the certified staff.

In our reordering of the Bidwell-Kasarda model, the percent nonwhite variable has been moved to a different place. Following the lead of Alexander and Griffin, we also placed PNONW with the environmental variables. Bidwell and Kasarda labeled PNONW as an environmental variable, but in their model this variable was placed on the right side of the model with only a direct effect on student achievement. The Bidwell and Kasarda model was constructed such that PNONW affected no other independent variable and was not affected by any other variable. Because of the large proportions of nonwhites in Louisiana, about 35% in 1970, we felt it prudent to include PNONW with the other environmental variables. It

is considered that this variable occurs at the same point in time as the other environmental variables, and in addition PNONW will have some effect on the intervening variables of district structure and staff composition.

A variable measuring the percent of the district population who are rural residents has also been included. This variable is included with other environmental conditions because it, too, describes the ecological conditions that exist within each school district. We felt this variable to be important because of the large proportion of the Louisiana population who are classified as rural residents (about 34%). In addition, most texts on "Rural Sociology" will express the view that rural residents have a life style that is different from their urban counterparts. The writing of Smith and Zopf (1970), Wayland (1958), Nelson (1955), Rogers and Burdge (1972), and even Sorokin and Zimmerman (1929) indicate that there will be differences in schools and in students due to a rural life style, hence this should be ecologically important.

The final change in our model revolves around the dependent variable, retention (RET). Bidwell and Kasarda insisted that the purpose of their model was to predict school district organizational effectiveness, not student achievement, as their critics claimed and then tried to do. Similar to Bidwell and Kasarda, we, too, are trying to predict organizational effectiveness. Unlike them, however, we have substituted the school district retention rate for student achievement. The retention rate is a measure of how effectively the school district organization is meeting on organizational goal--specifically, the graduation of students from high school. Hence, it should be a more accurate measure of how

effectively the school district organization is succeeding. Possibly our estimates of effects will not be as high as those of Bidwell and Kasarda, but it must be realized that our model will be more likely to measure the goals of the school district. In short, our model may be a better characterization of the effectiveness of a district, especially when one considers that public school allocations are made on the basis of students enrolled. Again, the prevailing axiom is the more students, the more money for the district. Thus retention of students is serious business for district personnel and a test of its organizational effectiveness.

In addition, our model reduces bias that is inherent in the Bidwell and Kasarda model. Hannan, et. al. indicate that grouping of data that should be measured for individuals will cause bias. Bidwell and Kasarda took achievement data for individuals and grouped it for their district achievement measure. Our measure of retention rates, however, is a legitamate characteristic of the school district. Variation between individual students will have little effect on this measure. Hence, bias that is inherent in the Bidwell and Kasarda model should be removed from our model.

Data

For this study to be comparable to the Bidwell-Kasarda study, it was necessary to have a sample of school districts that was representative enough to cover the spectrum of possible values. Bidwell and Kasarda had a sample of 104 of the Colorado school districts that accounted for 90 percent of the public school students in Colorado in 1969-70. Due to a rather unique characteristic of Louisiana school destricts, we were able to get complete coverage (100%) of the public school students in Louisiana in 1974-75. There are 66 school districts in Louisiana that are primarily

based on the 64 parishes. None of these districts overlap across parish boundary lines. Two school districts are contained within the city limits of Monroe and Bogalusa. These districts also coinside with the geographical boundaries of the cities. Since we know that our data are representative (because we have, in effect, collected data for the total public school population), there should be relatively little sampling error within our study.

The data that were needed for this study to be comparable to that of Bidwell and Kasarda were readily available. The data on the children from low-income faiilies, the percent nonwhite, the percent rural residents and the educational level of the parental risk population were obtained from the 1970 census of the population for the state of Louisiana. Since school district geographical boundaries coincided with parish and city boundaries, there was no need to transform any of this data. The data for the remaining variables were obtained from the annual reports of the Louisiana State Department of Education. Most of these data were in the 1974-75 report, but one variable was based on the 1971-71 report.

Operationalization of Variables

When operationalizing the variables for this study, the goal was to make our variables as similar as possible to those of Bidwell and Kasarda. The variables and their operationalization are as follows:

Environmental Conditions:

School District Size -- average daily attendance. This variable will be transformed by logarithms (just as Bidwell and Kasarda did) to correct for a skewed distribution caused by a few very large school districts. Log_{10} will be used. (SIZE)

Fiscal Resources -- the total of all revenue received by the school district (local, state, and federal), divided by the average daily attendance of the district. This division will standardize the variable for the size of the district. (RESOURCES)

Disadvantaged Students -- the percent of all children (ages 0-18) residing in the school district, who come from families with incomes below the nationally-defined poverty level of 1970. (DISAD)

Parental Education -- the percent of males 20-49 years old and females 15-44 years old residing in the school district who have completed at least four years of high school education. This variable is based on the parental "risk" population--those that could be parents; not necessarily those that are. (EDUC)

Percent Nonwhite -- the percent of the population residing in the school district who are classified by census definition as nonwhite. (PNONW)

Percent Rural -- the percent of the population residing in the school district who are classified by census definition as rural residents. This variable was not included in the Bidwell-Kasarda model. (RURAL)

Structural Conditions:

Pupil-Teacher Ratio -- the average daily attendance of the school district divided by the number of full-time teachers. (PTRATIO)

Administrative Intensity -- The ratio of administrators to classroom teachers. Administrators are defined as principals, superintendents, directors, supervisors and business agents. (ADMIN)

Professional Support Component -- The ratio of professional support staff to classroom teachers. The professional support staff is defined as librarians, guidance counselors, visiting teachers, agricultural agents, home demonstration agents, and medical personnel. (PROF)

Staff Composition Conditions:

Certified Staff Qualifications -- the percent of the total certified staff with at least the Master's degree. The certified staff is defined as principals and classroom teachers. (QUALIF)

Dependent Variable:

Retention -- the retention rate of the school districts. This is the percent of all ninth graders in the school district in 1971-72 who graduated from high school in 1974-75. (RET)

Results

The first step in analyzing these data is to consider the zero-order correlations. Eleven of the fifteen possible correlations among the environmental variables proved to be statistically significant, Table 1. SIZE was significantly correlated with all of the other exogenous variables. In particular, the correlations between SIZE and RURAL ($r = -.699$), DISAD ($r = -.596$), and EDUC ($r = .538$) were quite high (i.e., $p<.001$). This indicated that rural students and disadvantaged children are not as likely to be found in large school districts. However, the larger the district, the more likely that parents will have higher education levels. RESOURCES had statistically significant correlations only with SIZE ($r = -.309$, $p<.05$) and PNONW ($r = .242$, $p<.05$). This indicates that fiscal resources decreased as school district size increased, but the resources and nonwhite population varied together in a positive way. DISAD was significantly correlated with all exogenous variables except RESOURCES. Especially striking were the correlations between DISAD and PNONW ($r = .728$, $p<.001$) and EDUC ($r = -.624$, $p<.001$). Not only are disadvantaged children likely to be nonwhite but they also are likely to have parents with low education levels. EDUC was significantly correlated with all exogenous variables except RESOURCES. The largest relationship was that between EDUC and RURAL ($r = -.632$, $p<.001$). Apparently parents with high levels of education are less likely to live in rural areas. Similar to the correlations among the environmental variables, there was also much intercorrelation among the intervening, structural variables. PTRATIO, ADMIN and PROF were all significantly correlated with each other. QUALIF was not significantly correlated with any

of the other intervening variables. Finally, only four variables were significantly correlated with the dependent variable, RET and they were all at the .05 level. These variables were SIZE (r = .276), DISAD (r = -.272), RURAL (r = -.257), and QUALIF (r = .274).

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Table 1 about here

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Although there was a good deal of correlation among the variables in our model, the relationships changed markedly when our model was tested with regression analysis. First, of the six environmental variables with posited effects on pupil-teacher ratio, only three were statistically significant, Table 2. In our model it was clear that in these direct effects, fiscal resources, parental education level, and the percent rural population were the best predictors. The effects of fiscal resources and the percent rural population are fairly straightforward. The positive effect of percent rural suggests that the greater the percent rural, the larger the pupil-teacher ratio. The negative effect of fiscal resources, on the other hand, suggests that the greater the fiscal resources, the smaller the pupil-teacher ratio. It is the positive effect of parental education level that is somewhat surprising. This suggests that the higher the parental education level, the larger the pupil-teacher ratio. This is the opposite of what was expected and will be discussed further below. The six variables combined explained 56 percent of the variance in pupil-teacher ratio.

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Table 2 about here

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Second, as was the case with pupil-teacher ratio, so, too, was the administrative intensity of the district effected significantly by three environmental variables. However, they were not the same three variables. Only fiscal resources was again found to have a significant direct effect. The positive sign of fiscal resources indicated that administrative intensity was greater as fiscal resources were greater. An inverse relationship was found between school district size and administrative intensity. This indicated that as size got larger, administrative intensity decreased. Or conversely, smaller school districts had proportionately larger administrative intensity--the opposite of what we anticipated. The third significant direct effect was the variable on disadvantaged children. Apparently, in districts with high proportions of disadvantaged children there will also be comparatively greater numbers of administrative staff relative to teaching staff. This particular relationship was the strongest found in the whole model and was of such magnitude that by itself it explained approximately forty percent of the variance in administrative intensity. It would seem that if one wished to know the administrative intensity of a school district, the key variable about which one might wish some information would be the percent of disadvantaged children in the district relative to the other children.

The third structural variable, professional support component, had no significant direct effects to it from any of the environmental variables. Only school district size, fiscal resources, and rural population were of sufficient magnitude to approach statistical significance. It

is interesting to note the relative predictive power of these three variables. While all six environmental variables accounted for almost 28% of the variance in professional support component, the three variables just mentioned, alone, accounted for nearly all of that 28% ($R^2_{I.ABE} = .26$).

The fourth intervening variable, staff qualifications, was significantly effected only by fiscal resources. However, parental education level was very nearly twice its standard error which would have indicated acceptable statistical significance. As we have done for two of the previous structural, intervening variables, this variable also provides an interesting case of the explanatory power of a reduced number of environmental variables. Fiscal resources and parental education level, alone, account for approximately 15% of the explained variance versus only 18% for the total variables.

Lastly, we have our key dependent variable, student retention. We had theorized that each of the environmental and structural variables would have a direct effect on retention. Our analysis indicated, however, that only staff qualifications had a significant effect. While several other variables approached statistical significance (e.g., disadvantaged children and parental education level), none attained it. The relationship between staff qualification and retention suggests that as staff qualifications are improved, retention rates will also be improved. Although neither the disadvantaged children nor parental education level variables were significant each of them was inversely related to retention. This inverse relationship seems understandable for disadvantaged children--retention rates go up as the percent disadvantaged children goes down.

However, the relationship between retention and parental education level is not as easily explained. Our analysis indicated that higher levels of parental education have a depressing effect on retention rates. In short, as retention rates go down (i.e., where fewer students are retained in a cohort), parental education levels go up. This is puzzling, to say the least, and will be discussed at length below. With all ten independent variables, only 21% of the variance was accounted for.

Having tested for direct effects, the next step in our analysis was to decompose the model as outlined by Alwin and Hauser (1975), whereby we could get a better estimate of direct, indirect and total effects. The results of this analysis are reported in Table 3. Of the six times when mediation could have occurred, only two cases of mediation effects was especially sizeable (i.e., nearing 50% for any particular variable). Nearly 90% of the effect of RESOURCES was mediated by the intervening structural variables. Approximately half of this was attributed to QUALIF. In other words, RESOURCES itself has a rather small direct effect on RET, but its indirect effect (on RET), as it is mediated by QUALIF, is quite large. Of somewhat lesser magnitude, but still of considerable size, were the mediated effects for PNONW. Mediated indirect effects accounted for 49% of the total effects of PNONW. The largest portions of this were mediated through ADMIN and QUALIF.

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Table 3 about here

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The remaining independent variables had rather small indirect effects. The amount of their total variance mediated by the intervening variables ranged from 30.4% (for RURAL) to 37.2% (for EDUC). It probably should be pointed out that those variables with the largest mediated effects (RESOURCES and PNONW) were the variables with the smallest total effects. Consequently, other independent variables may have had larger indirect effect values, but smaller indirect effect proportions. So, it was considered that these variables did not have a great deal of mediated effects.

A review of the mediated effects in Table 3 shows that PTRATIO never really mediated the effects of the independent variables. The largest indirect effect mediated by PTRATIO was .007 (absolute value) for RESOURCES which is essentially no effect at all. Administrative intensity served best as a mediator of the effects of DISAD (.126) and SIZE (-.061). The professional support component was another intervening variable which did not have any real mediating effect for the independent variables. The largest indirect effect mediated by PROF was .009 (absolute value) for RESOURCES. At times, qualifications of the staff seemed to be quite important as a mediator of independent variable indirect effects. QUALIF was best a mediator of the effects of EDUC (.102) and RESOURCES (.081).

Discussion

Three variables had significant effects on PTRATIO: RESOURCES, RURAL and EDUC. We had anticipated an inverse relationship between

RESOURCES and PTRATIO and this was the case in the Louisiana data. It was not surprising since we had posited that the districts with more money would have lower pupil-teacher ratios. We had posited that there would be a positive relationship between RURAL and PTRATIO and there was. This suggests that rural areas have less fiscal resources with which to attract and/or retain teachers and staff. Hence those teachers located in rural areas would have to teach larger classes than teachers in non-rural areas.

The anomaly in the analysis on PTRATIO was the effect from EDUC. We had posited an inverse effect whereby pupil-teacher ratio would decrease as parental education level increased. This seemed reasonable since more highly educated parents can financially afford to live in areas where the schools are less-crowded and perhaps offer a "quality" education. It is hard to imagine that this would be otherwise--i.e., highly-educated parents wanting to live in areas with higher pupil-teacher ratios. And yet, this is what we found. Our explanation for this is based on our understanding of the use of public and private schools in Louisiana.

It must be noted that Louisiana has a very large Catholic population. Historically, Catholic parochial schools have been heavily supported and have even received favorable treatment in the state legislature wherein funds have been appropriated for them. While it is merely speculation at this point, we suggest that the peculiar effect on EDUC on PTRATIO is a by-product of the large attendance at parochial

(and private) schools. It seems reasonable to speculate that those students attending parochial schools, which require tuition, will be more likely to come from families who can afford to send them. In short, a disproportionate number of students attending parochial schools will come from higher SES families. The result of this is to inflate the number of students attending public schools who came from relatively lower SES families for whom the parochial schools would be an unaffordable financial burden. This seems especially likely in the urban areas of the southern part of the state which are also the most heavily Catholic (areas such as New Orleans, Lafayette and Lake Charles). Thus these areas may have parents with higher education levels residing in them but many of these parents may be Catholic and sending their children to private schools. For them, then, the schools with higher pupil-teacher ratios are not a problem because while they are <u>in</u> a particular school district they are not necessarily <u>of</u> it.

Additionally, it should be noted that as a result of widespread implementation of school desegregation practices, private school academies began to appear, particularly in the early 1970's. Again, it is the parents with the higher education and income who can most easily afford to send their children to these schools. The most drastic illustration of this possibility is in West Baton Rouge parish where for a cohort of ninth grade students, roughly 65% graduated from high school four years later. This 65% level was fairly constant between 1965 and 1975, with one exception. In 1970/71 when school desegregation hit full-force, of the cohort who would have graduated in that school year, only 28% were still in school. Having inquired about this finding we were

told that the remainder had either dropped out of school or begun attending one of the two "academies" which were hastily created to avoid desegregation.

The second structural variable to be discussed is ADMIN which also had significant effects from three variables. We had posited a negative relationship between SIZE and ADMIN. Our reasoning was that increasing size would not necessarily require or evidence a concomitant increase in the proportion of administrators. This is what we observed and our explanation for it is that there is an economy of scale in such organizational attributes as the ratio of administrators to staff. While a minimum number of administrators may be necessary for any organization (and particularly a fairly large and complex one like a school district), beyond that figure the increase in administrators will be determined by organizational need which will not increase in direct proportion to an increase in staff (especially teachers).

The second variable with a significant effect was RESOURCES. This was expected since districts with more money would be more likely to have more special programs and a greater need for administrative staff. Although it may not be necessary to increase administrative staff in direct proportion to school district size increase, if there is more money available, it is likely that this will eventuate in the hiring of more administrators.

The third variable with a significant effect on ADMIN was DISAD. This, too, was expected. School districts with a large number of disadvantaged children will be more likely to have various remedial programs. This is especially evident with Title 1 finding, free lunch

programs, etc. There is also likely the possibility of persons to supervise visiting teacher programs, truancy programs, and so on. Since this was by far the largest effect for any relationship in the model, we speculate that if one wished to know the ratio of administrators to staff in a school district, the variable about which one would want information would be the proportion of disadvantaged students.

When we analyzed the effects on the environmental variables on PROF, no significant effects were found. It had been assumed that larger districts and those with more money would need and/or could afford more professional staff. Also in areas where the parents were highly educated there would be greater pressure for more counselors, accelerated programs, etc. to provide a better education programs. Since nonwhite and disadvantaged students have tended to do poorer in school (relative to white/advantaged students), it was assumed that they would need help from specialists providing remedial assistance. However, since none of the effects were significant, nothing much can be said except that none of the independent variables is a very good predictor of the proportion of professional staff in the district.

The last intervening variable was QUALIF. The assumption was made that as school districts had increasing financial resources, they would be able to afford, attract and retain more educated teachers. This relationship was the only one of statistical significance for the QUALIF variable. As the fiscal resources of a district increased, the ratio of teachers with advanced degrees to those without advanced degrees

increased also: apparently, the more money available to the district, the better educated will be the staff. Districts with more money not only may pay better salaries but they may also generate special programs which require more qualified staff who will then merit this extra pay. One other variable bordered on having statistical significance, EDUC ($p < .06$). We had posited that more highly educated parents would reside in areas where there would be more highly educated teachers. Although not of statistical significance, the relationship was strong enough to offer at least some support for the hypothesis.

When we consider the four intervening variables, the model did quite well--especially for PTRATIO and ADMIN. The six environmental variables accounted for 56% of the variance in PTRATIO and 64% of the variance in ADMIN. For sociological analysis, the power of the model was good. For PROF and QUALIF the model did less well. Only 28% of the variance was accounted for in PROF and only 18% of the variance for QUALIF. Thus one indicator of district staff (ADMIN) was explained fairly well while the two remaining indicators (PROF and QUALIF) were poorly explained.

Of the ten variables with posited effects on RET, only the effect of QUALIF was significant. The finding just discussed above (i.e., on the staff variables) was not borne out in the analysis of retention. Whereas ADMIN was well explained and PROF and QUALIF poorly explained, when RET was regressed against them only QUALIF had a significant effect. It at least appears that above all else, when considering organizational attributes of school districts and retention rates, the most important factor is the proportion of teachers with advanced degrees. This finding is partly supported in the literature but not

completely. In the literature, one finds reference to studies which suggest that one of the best ways to reduce dropout rates is to increase the professional staff (see Miller et al., 1964; Brown & Peterson, 1969). And yet, in this study only the QUALIF variable had a sizeable effect. Both ADMIN and, more theoretically cogent, PROF were of little effect which calls into question strategies for increasing retention rates.

Two other variables were of sufficient effect on RET to also warrant some discussion. First, EDUC once again behaved in a peculiar manner--exactly the opposite of what we had expected. We had hypothesized that the effect from EDUC to RET would be positive. It seemed reasonable to anticipate that parents with high education would reside in districts where retention would be high--i.e., highly educated parents would be likely to have highly educated children, hence children who would stay in school. Instead, what we found was an inverse relationship between EDUC and RET and we suggest that this is for the same reasons previously discussed.

The other variable worth discussing is DISAD. The DISAD variable was important in our analysis (just as it was in Bidwell and Kasarda's) because it is a good indicator of SES in the district: the higher the DISAD, the lower the SES or the poorer the families with children in the public schools. We had posited that there would be an inverse relationship between DISAD and RET, since greater proportions of disadvantaged children would be less likely to stay in school. Although the analysis did not yield a significant effect, the effect was of sufficient absolute magnitude that we feel safe in saying that there is reason to believe that DISAD may be an important variable in the

prediction of retention.

Of the mediated effects, we will discuss only one. Of the six exogenous variables, RESOURCES had a substantial amount of its effect mediated by the intervening variables. This is not really surprising. It is difficult to imagine how money, by itself, could somehow raise the retention rate. Merely having the financial resources is not going to cause more students to graduate from high school. The important consideration is knowing how the resources are allocated, and, indeed, this is what the mediated effects show. In particular, the intervening variable QUALIF best mediated the effect of RESOURCES on RET. Fiscal resources cannot raise retention rates, but the resources can increase the number of better-educated teachers and these teachers may then help raise retention rates through their effectiveness.

Summary and Conclusions

The purpose of this paper was to provide a near replication of the Bidwell-Kasarda model of school district organization. In lieu of achievement as the dependent variable, we chose the retention rate for all Louisiana school districts for the 1974/75 school year. The model worked well in accounting for the variance in two of the intervening variables, pupil-teacher ratio and administrative intensity, however for the other two intervening variables, professional staff and qualifications of the teachers, and for the dependent variable, retention, the model accounted for only a small amount of the variation.

The remains to again focus on the main theme of this paper--that retention rates are merely an indicator of organizational effectiveness.

Just as Bidwell and Kasarda stressed that their research was not a study to explain student achievement, neither was this strictly a study of student retention. Rather, retention was used in lieu of achievement but it was used as an indicator of the ability of the organization to accomplish a goal. Given the lack of explained variance in the dependent variable, it appears that the organizational attributes incorporated in our model are inadequate--at least for estimating retention and for successfully producing high retention rates. If retention is a legitimate goal for a school district, and is in part determined by organizational factors, then more work must be done to seek out important organizational variables and determine how well they succeed in predicting retention.

Finally, it is necessary to consider the place of this study in the Bidwell-Kasarda controversy. One important contribution is the use of school district retention rates as the new dependent variable. Bidwell and Kasarda's use of student achievement was criticized because it removed variation that should have been included: achievement scores will vary from individual to individual in a school district. With Bidwell and Kasarda's district measure for student achievement, they, in effect, assigned a constant measure to each student in a district. For example, students in one district might have ranged from 60 to 140 on some achievement scales, but if the median was 100, they all were assigned a constant 100 score. In another district the range may have been the same (60-140), but if the median was 101, all the students in

that district would be assigned a constant score of 101. Thus, the variation for individuals might have ranged from a score of 60 to 140, but if district medians are used the scores only vary from 100 to 101. It is obvious that a great deal of the total variation is removed. Hannan, et al., (1976) suggest that if this variation is removed, the standard regression coefficients will be biased on the high side. As the total variance is reduced, the standard deviation of the dependent variable is reduced (because the standard deviation is the square root of the variance), resulting in larger standard regression coefficients. The lower (than it should be) standard deviation of the dependent variable in the denominator of the equation will cause a higher effect to be calculated. Larger effects are more likely to (incorrectly) indicate significant paths in the mode. Alexander and Griffin (1976a and 1976b) also were concerned with the very large effects reported by Bidwell and Kasarda. They felt that the results weren't as reliable as Bidwell and Kasarda thought they were.

The next step is to consider the use of student retention as the dependent variable. It is true that dropping out of school can be affected by individual characteristics, but the measure of retention will not be affected by this. Even though this measure was made for a district, all of the total variation should be included in the variable. For example, suppose that school district A had a retention rate of 80%. That means that 4 out of 5 students in a cohort graduated from high school; one did not. Any of the students included in that cohort can be placed in his position on this measure. This is

because the only variance can be from "yes", the student graduated (the 80%), to "no", the student did not graduate (the 20%). Variation from student to student is not removed, yet a logical measure for the district has been established. It is not possible in this measure to tell where the variance is situated. For instance, individual schools will vary in retention rates, but this variation cannot be ascertained from these rates, nor can particular individual variation be determined. If the variance has not been removed, then these effects should not be biased due to the minimized standard deviations. Some may argue that this is a "bureaucratic" type measure, but for us this is a plausible way to test the effectiveness of a complex organization (i.e., as a "bureaucracy").

The final step then is comparing the model used in this study with the Bidwell-Kasarda model of school district organizational effectiveness. Bidwell and Kasarda explained approximately 25% of the variance in their dependent variable. In this study, about 21% of the variance in retention rates was accounted for. Most of the paths hypothesized by Bidwell and Kasarda were found to be significant. Many of the path coefficients were quite high. At this point it is necessary to recall the criticism of Hannan, et al., concerning the method in which these effects were calculated. In this study only eight significant paths were found out of 31 hypothesized relationships. The effects in most cases were not especially high. However, this study did, to some extent, solve the problem of Bidwell and Kasarda's biased effects and may offer a more accurate estimate of organizational effects.

Neither study accounted for much variation (21% and 25%). The main contribution of this study is the implication that the basic Bidwell-Kasarda model may be (a) not a salient means by which to measure the effectiveness of school district organizations and (b) in need of further work to adequately specify causal arrangements among organizational variables in divergent educational settings.

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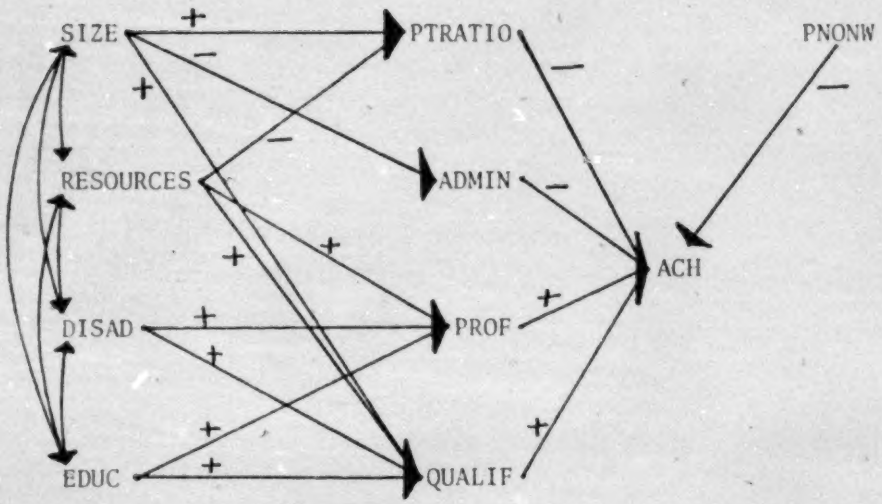
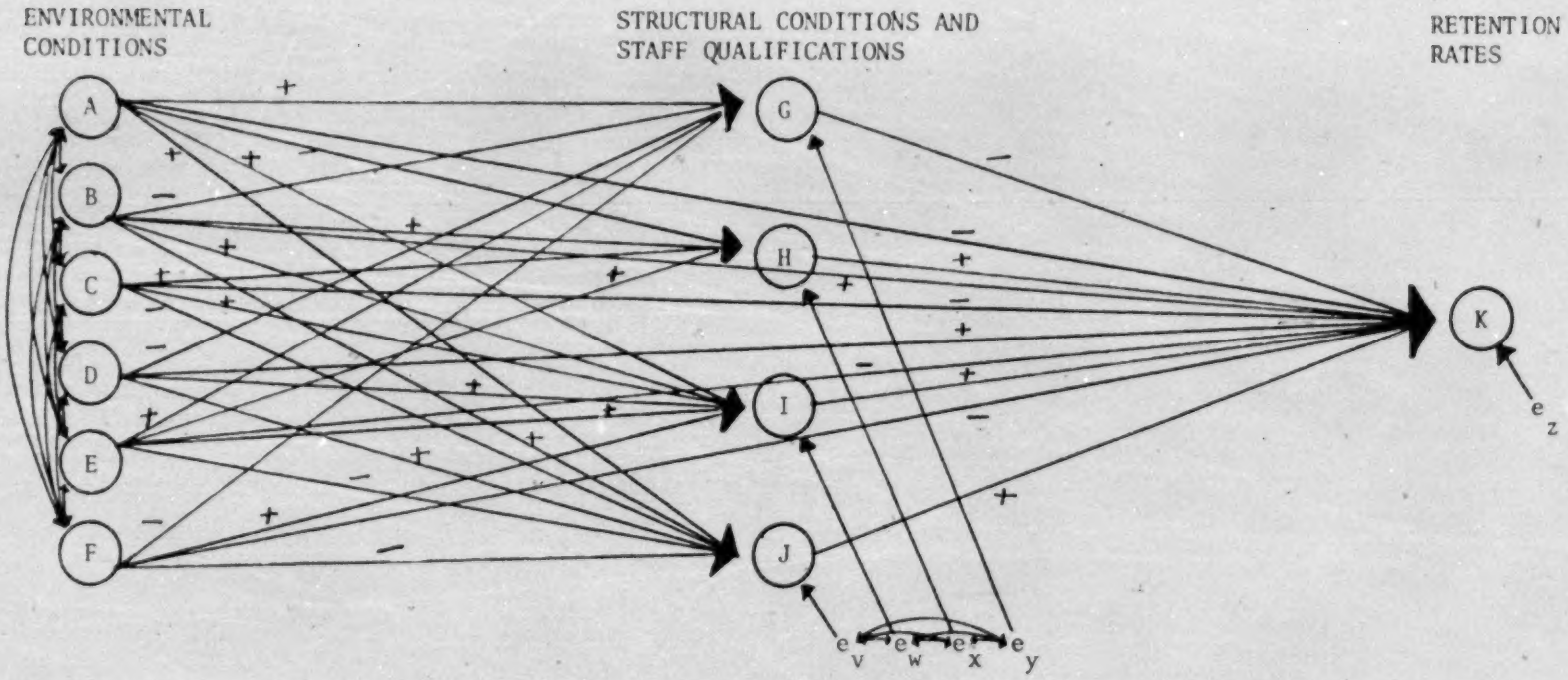
Figure 1. The Bidwell-Kasarda Model of School District Organization and Student Achievement



Source: Bidwell and Kasarda (1975: 60)

Figure 2. A Causal Diagram of a Model of School District Organizational Effectiveness for Louisiana



The variables are: A = school district size; B = fiscal resources; C = disadvantaged children; D = parental education; E = rural population; F = nonwhite population; G = pupil-teacher ratio; H = administrative intensity; I = professional support component; J = qualifications of the staff; and K = retention rate.

TABLE 1

ZERO-ORDER CORRELATIONS, MEANS AND STANDARD DEVIATIONS OF VARIABLES IN A MODEL OF SCHOOL DISTRICT ORGANIZATIONAL EFFECTIVENESS (N = 66)

Variables[a]	A	B	C	D	E	F	G	H	I	J	K
A	--										
B	-.309*	--									
C	-.596***	.212	--								
D	.538***	-.210	-.624***	--							
E	-.699***	.208	.431***	.632***	--						
F	-.363**	.242*	.728***	-.377**	.138	--					
G	.450***	-.537***	-.527***	.477***	-.216	-.533***	--				
H	-.683***	.408***	.670***	-.460***	.547***	.397***	-.385**	--			
I	-.453***	.352**	.333**	-.309*	.405***	.242	-.322**	.486***	--		
J	.016	.248*	-.032	.241	-.168	.094	-.077	-.026	-.063	--	
K	.276*	.039	-.272*	.174	-.257*	-.186	.097	-.162	-.154	.274*	--
Mean	3.861	1256.8	36.70	29.41	58.64	32.40	18.90	8.13	7.65	34.27	64.19
Std. Dev.	0.384	161.9	13.01	7.86	27.65	14.27	1.35	2.47	2.09	8.22	7.38

[a]The variables are: A = school district size; B = fiscal resources; C = disadvantaged children; D = parental education level; E = rural population; F = nonwhite population; G = pupil-teacher ratio; H = administrative intensity; I = professional support component; J = qualifications of certified staff; and K = school district retention rate. ***$p \leq .001$; **$.001 < p \leq .01$; *$.01 < p \leq .05$

TABLE 2

STANDARD REGRESSION COEFFICIENTS, COEFFICENTS OF DETERMINATION AND RESIDUALS FOR A MODEL OF SCHOOL DISTRICT ORGANIZATIONAL EFFECTIVENESS (N=66)

Predetermined Variables[a]	Dependent Variables[a]				
	G	H	I	J	K
A	.250	-.285*	-.206	-.100	.212
B	-.387***	.231**	.228	.277*	.017
C	-.057	.593***	.053	.023	-.296
D	.334*	.156	.034	.347	-.240
E	.305*	.164	.204	-.102	-.181
F	-.223	-.157	.060	.119	-.077
G					-.019
H					.213
I					-.039
J					.293*
R^2	.562	.642	.277	.178	.209
Residual	.662	.599	.850	.906	.943

[a]The variables are: A = school district size; B = fiscal resources; C = disadvantaged children; D = parental education level; E = rural population; F = nonwhite population; G = pupil-teacher ratio; H = administrative intensity; I = professional support component; J = qualifications of the staff; and K = school district retention rate. ***$p \leq .001$; **$.001 < p \leq .01$; *$.01 < p \leq .05$

TABLE 3

INTERPRETATIONS OF EFFECTS IN A MODEL OF SCHOOL DISTRICT ORGANIZATIONAL EFFECTIVENESS (N=66)

Predetermined Variables[a]	Total Effects	Indirect Effects Via[a]				Direct Effect	% Due to Direct	% Due to Indirect
		G	H	I	J			
A	.315	(-)[b].005	(-)[b].061	.008	(-)[b].029	.212	67.3%	32.7%
B	.163	.007	.049	(-)[b].009	.081	.017	10.4%	89.6%
C	.432	.001	.126	(-)[b].002	.007	(-) .296	68.5%	31.5%
D	.382	(-)[b].006	.033	(-)[b].001	.102	(-) .240	62.8%	37.2%
E	.260	(-)[b].006	.035	(-)[b].008	(-)[b].030	(-) .181	69.6%	30.4%
F	.151	.004	(-)[b].033	(-)[b].002	.035	(-) .077	51.0%	49.0%

[a]The variables are: A = school district size; B = fiscal resources; C = disadvantaged children; D = parental education level; E = rural population; F = nonwhite population; G = pupil-teacher ratio; H = administrative intensity; I = professional support component; and J = qualifications of the staff.

[b]Absolute values were used to compute direct and indirect effects, since the magnitude of influence, regardless of its direction, was of primary importance in this analysis.